

### REMARKS

Claims 1-2, 5, 7-23, 51, 53, 55-66, and 68-75 remain pending in the application. Claims 13 and 14 remain withdrawn for being drawn to a non-elected species.

### REJECTIONS UNDER 35 U.S.C. § 103

Claims 1, 2, 5-12, 15-21, 23, and 51-74 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyazawa (U.S. Pat. Pub. No. 2003/0235735, hereinafter "*Miyazawa*") in view of Yamada (U.S. Pat. No. 5,432,023, hereinafter "*Yamada*"). As noted above, Claims 6, 52, 54, and 67 have been cancelled, thus the rejection is moot with respect to these claims. For the remaining claims, this rejection is respectfully traversed.

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Miyazawa* and *Yamada*, as applied to Claim 1 above, further in view of *Davis* (U.S. Pat. Pub. No. 2002/0001743, hereinafter "*Davis*"). This rejection is respectfully traversed.

The rejection is based on a mistaken interpretation of the Miyazawa patent as having a "porous liquid distribution media (LDM)" at reference number 14 in Figure 2. Element 14 is, however, a "hydrophilic membrane 14 [ ] formed by coating a slurry or a coating containing a hydrophilic material onto only the bottom 13 and both wall faces 12 of the gas flow groove 7." Para. [0033]. There is no indication whatever that member 14 is porous. See also para. [0009] ("forming a membrane from a hydrophilic electrically-conductive coating applied to the surface of the projections"); Fig. 3, steps S2 & S3 ("coating containing a material with hydrophilic properties is coated onto the surface of the separator"; "coating is dried");

The ribs 11 may be porous for thermal insulation. Paras. [0029]-[0030] &[0032]. This, however, is in no way related to liquid distribution as set out in Applicants' claims and described in Applicants' specification. The rib is formed by molding a filled resin, then graphitizing the resin. Para. [0031]-[0032]. The hydrophilic coating 14 applied is a separate element and is applied after the rib is formed Para. [0033]. The coating is hydrophilic, but hydrophilicity is a property separate from porosity. Nothing about "hydrophilic" implies "porous."

Nor is there anything special about the only disclosed composition for the coating, as it appears to be merely a black thermoset vinyl coating. See para. [0056] (PVA, "liquid phenol" (probably a phenolic crosslinker for the PVA, since the coating is "allowed to dry for 12 hours) and carbon black). Compare, Applicants' porous liquid distribution media, Specification paras. [0035]-[0058], particularly the examples of such porous media given in paras. [0049] (made from a composition with a pore forming constituent), [0052]-[0053] (treated after application to create the porous media according to the pore forming constituent that was selected) &[0054]-[0058] (other examples).

As in the present case, where the cited reference does not use the same terms as Applicants' claims, it is incumbent on an examiner to not merely reproduce Applicants' claim language with a citation to the reference, but further to explain how the cited disclosure describes what is in the claim. *In re Glaug*, 283 F.3d 1335, 1340 (Fed. Cir. 2002) ("Although the Solicitor states that Nomura expressly teaches 'applying adhesive' in 'spaced apart zones,' these words are quoted from Gulag, not [the] Nomura [reference]."). Nothing in Figure 2 shows coating 14 being porous; even more

importantly, nothing in Figure 14 being porous as that claim term must be interpreted in accordance with Applicants' specification and the claims themselves. See *Phillips v. AWH*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

As the Examiner was under this misapprehension about coating 14, the rejection contains no reason to modify the Miyazawa electrochemical cell to replace its disclosed coating with a porous liquid distribution media. For this reason, the rejection fails to set out a prima facie case of obviousness. Respectfully, Applicants believe that no such reason exists, as the art failed to provide any reason to make such a modification; the modification resulted only from the insight of these inventors, coupled with their ingenuity in bringing the concept to practice.

The claims are further patentable over the Miyazawa reference for the independent reason that there is no reason to modify that reference to include the claim feature of the liquid distribution media contacting the fluid distribution layer in regions corresponding to the lands to form an electrically conductive path. Each of the claims include a feature of the flow channels comprising lands and grooves, the liquid distribution media contacting the fluid distribution layer in regions corresponding to the lands to form an electrically conductive path between the impermeable electrically conductive element and the conductive fluid distribution layer. The Miyazawa reference takes extra steps in its process to completely remove its coating 14 from the lands. Fig. 3, steps S4-S6; Figs. 2 & 4a, showing no coating on the lands; as well as the description in the specification for these figures, especially paras. [0009], [0028], [0033], [0040], [0048]. The Miyazawa reference explains that having no coating on the lands is important for its invention. Miyazawa views it as a necessary step to prevent water from

freezing there. Applicants understand that the Yamada patent is cited also for its teaching of pore size, but the Examiner must consider that even if Yamada is consulted, the only the Miyazawa ribs 11 are porous, and these only for the purpose of providing thermal insulation.

The Office Action cites 16:25-40 in Yamada, but this passage says only that when a separator plate is made of a porous material, the pores must be blocked so that the fuel and oxidant remain separated. At most, when taken with the Miyazawa reference, the combination teaches that the Miyazawa plate 10 must be impermeable.

The Yamada patent further teaches porous cathodes 38 touching, on one end, a water recovery wick material in a chamber 35 abutting an edge of the fuel cell stack 32. Yamada 37: 64 to 38:11 & Fig. 21, 22. The other citations in the Office Action refer to this feature of Yamada. The cathode material of Miyazawa is already porous (as in all fuel cells) to allow oxidant to reach the PEM. Miyazawa, para. [0019] (gas diffusion electrodes). Miyazawa does not, however, include the water recovery wick material in chamber 35 of Yamada that abuts an edge of the fuel cell stack 32. Thus, in combination, the Miyazawa and Yamada references would lead one to add such a chamber to one edge of the Miyazawa fuel cell stack or to add a hydrophilic coating to the walls and bottoms, but not the lands, of the Yamada separator 37. This combination does not, however, produce the electrochemical cells of Applicants' claims, either in regard to the porous liquid distribution media disposed in the flow channels feature or the disposed both on lands and grooves feature.

Applicants appreciate the Examiner's point that the teachings of the cited references must be considered in combination, but where one reference (Miyazawa)

teaches away from a feature (coating on the lands) and the other reference (Yamada) fails to explain or countermand the teaching away, then there can be no obviousness in the face of the clear teaching away from a modification that would lead to Applicants' invention. The combined references teach away from the claim feature of the "liquid distribution media contact[ing] said fluid distribution layer in regions corresponding to said lands," any remaining edge portion in the Miyazawa grooves notwithstanding.

All of the pending claims are patentable over the combination of Miyazawa and Yamada for the above reasons.

Claims 12, 51, and 65 are further patentable over the combination because the combination does not teach a liquid distribution layer media (even if one were to accept the Yamada porous material in chamber 35 as such) having two layers related as in the claim. These layers are in addition to the gas diffusion layer, which the rejection points to as one layer of the Yamada article. Moreover, as set out in more detail in the last Reply, the relationship of a larger pore size for the "wick" relative to the fluid diffusion layer is expressly taught away from by the Yamada patent, which requires a smaller pore size. The Examiner's argument on page 10 of "different pore sizes" doesn't address this distinction.

Pertaining to the separate rejection of claim 22 over Miyazawa and Yamada further in view of the Davis publication, the Davis publication disclosure fails to remedy these shortcomings of the other two references. The Davis publication is cited for its teaching of forming bipolar plates using certain metals. This teaching, when combined with the disclosures of the Miyazawa and Yamada references, still provides no reason to include the features of a porous liquid distribution media on the grooves and on the

lands of an electroconductive element. Thus, claim 22 is patentable over the cited combination.

For these reasons, Applicants request reconsideration of the claims and withdrawal of these rejections.

### **CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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